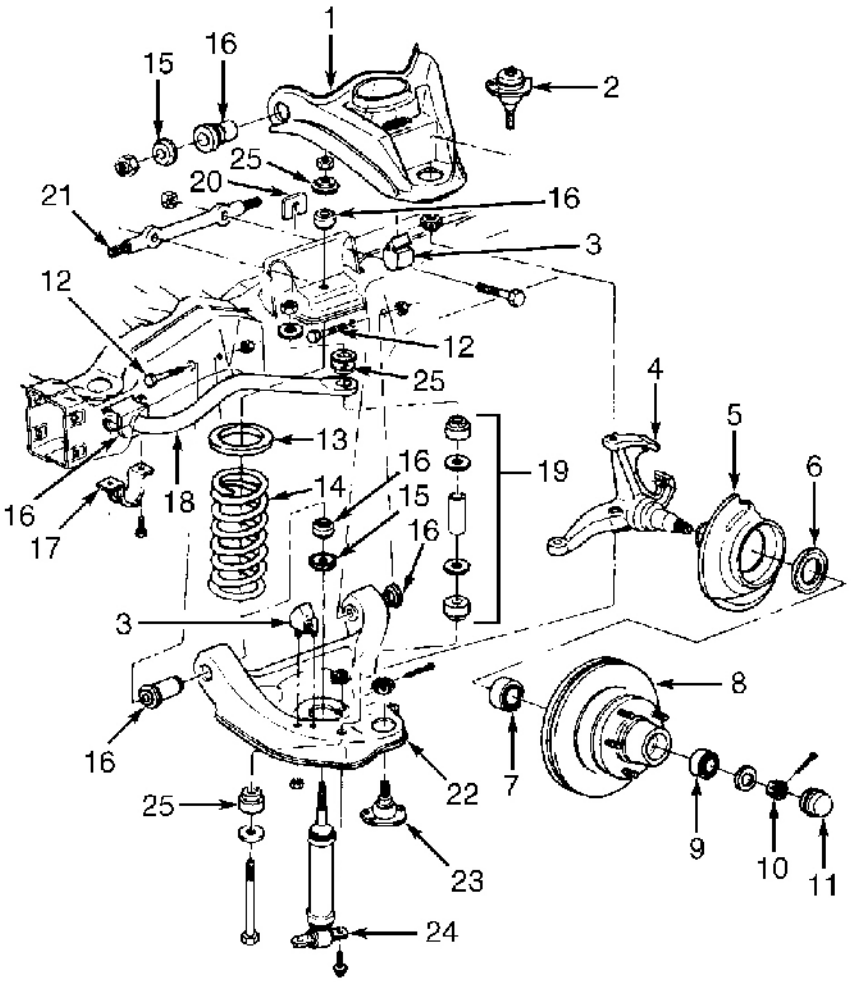
SUSPENSION - FRONT COIL SPRING (2WD)

1996 SUSPENSION General Motors Corp. - Front 2WD Coil Spring

DESCRIPTION

Independent front suspension consists of upper and lower control arms with steering knuckle mounted between ball joints. See **Fig. 1** . Upper control arm is mounted on pivot shaft. Lower control arm is mounted directly to frame with pivot bolts.

Coil springs are mounted between lower control arm and a formed seat in suspension crossmember. Shock absorbers fit between lower control arm and frame. A stabilizer bar is mounted to frame side rails and connected to lower control arms.



1. Upper Control Arm
2. Upper Ball Joint
3. Bumper
4. Steering Knuckle
5. Splash Shield
6. Grease Seal
7. Inner Bearing
8. Hub/Rotor Assembly
9. Outer Bearing
10. Spindle Nut
11. Dust Cap
12. Pivot Bolt
13. Spring Insulator
14. Coil Spring
15. Retainer
16. Bushing
17. Clamp
18. Stabilizer Bar
19. Bushing Assembly
20. Shim
21. Pivot Shaft
22. Lower Control Arm
23. Lower Ball Joint
24. Shock Absorber
25. Rubber Grommet

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Fig. 1: Exploded View Of Front Suspension (Typical)
Courtesy of GENERAL MOTORS CORP.

ADJUSTMENTS

WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES

NOTE: See WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES article in WHEEL ALIGNMENT section.

FRONT WHEEL BEARINGS

CAUTION: Never preload tapered roller bearings, or damage to bearings will result. Bearings are designed to have a slightly loose feel when properly adjusted.

1. Raise and support vehicle. Remove hub dust cap and cotter pin. Tighten spindle nut to 12 ft. lbs. (16 N.m) while turning wheel forward by hand. Back off nut until just loose.
2. Finger-tighten nut until snug. Loosen nut slightly until NEW cotter pin can be installed. DO NOT loosen nut more than 1/2 flat. Install cotter pin and measure hub end play. Hub end play (in and out movement) should be .001-.005" (.03-.13 mm). Install dust cap.

RIDING HEIGHT

NOTE: See WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES article in WHEEL ALIGNMENT section.

INSPECTION

BALL JOINT CHECKING

NOTE: Ensure wheel bearings are properly adjusted before checking ball joints. Replace ball joint rubber grease seal if cut or damaged.

Upper Ball Joint

1. Raise and support vehicle with jackstand under lower control arm, near lower ball joint. Ensure upper control arm bumper does not contact frame. Place dial indicator against lower part of wheel rim. Push in on bottom of tire while pulling outward at top. Read dial indicator, then reverse push/pull procedure.
2. Lateral (horizontal) deflection should not exceed .125" (3.18 mm). If deflection is excessive, replace ball joint. With ball joint disconnected from steering knuckle, check to see if ball joint can be rotated by finger pressure. Replace if ball joint can be twisted.

Lower Ball Joint

1. Wear indicator is built into ball joint. Wear is indicated by position of the 1/2" diameter round boss that grease fitting is threaded into. A new ball joint has a boss projection of .050" (1.27 mm) beyond cover surface.

2. With vehicle weight on wheels, ensure wear indicator protrudes beyond surface of ball joint cover. Replace ball joint if wear indicator is recessed or even with housing.

REMOVAL & INSTALLATION

WHEEL HUB/ROTOR & BEARINGS

Removal

1. Raise and support vehicle. Remove wheel and tire assembly. Remove brake caliper, and wire aside. DO NOT allow brake caliper to hang by brakeline. Remove dust cap, cotter pin, spindle nut and washer. Carefully remove hub/rotor assembly to avoid damage to spindle threads.
2. Remove outer bearing, inner grease seal and inner bearing. Clean bearings, and inspect bearings and races for damage. If races require removal from hub, drive old races from hub using hammer and Wheel Bearing Race Remover (J-29117-A).

Installation

1. To install, reverse removal procedure. Pack bearings with high-temperature bearing grease. Install NEW grease seal until seal is even with hub surface. Lubricate seal lip and hub cavity with wheel bearing grease.
2. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** . Adjust wheel bearings. See **FRONT WHEEL BEARINGS** under ADJUSTMENTS. Lower vehicle and check wheel alignment. See **WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES** article in WHEEL ALIGNMENT section.

SHOCK ABSORBERS

Removal

Raise and support vehicle. Remove wheel and tire assembly. Hold upper stem from turning while removing upper stem retaining nut, retainer and rubber grommet at top of shock absorber. Remove shock absorber-to-lower control arm bolts and nuts. Lower shock absorber from vehicle.

NOTE: Purging air from non-spiral groove shock is not required, as reservoir has gas-charged cell. Spiral groove shock has air-charged cell and air must be purged.

Inspection

1. On spiral groove shock, purge air from pressure chamber by mounting shock in vise (top end up) and fully extending unit. Reverse position (top end down) and fully collapse unit.

Repeat procedure several times.

2. Bench check shock unit by mounting in vise with top end up (top end down on gas-charged shocks). DO NOT clamp vise on reservoir tube or mounting threads. Check rubber grommets for deterioration and replace as necessary.
3. Operate shock by hand at various rates of speed and note resistance. Rebound force is normally stronger than compression force. If resistance is not smooth and constant, replace shock.

Installation

To install, reverse removal procedure. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** .

STABILIZER BAR

Removal

Raise and support vehicle. Remove wheel and tire assembly. Remove stabilizer bar-to-frame retaining bolts and clamps. See **Fig. 1** . Disconnect stabilizer bar from frame. Remove stabilizer bar-to-lower control arm retaining bolt, nut and washers. Disconnect stabilizer bar from lower control arm, and remove rubber grommets and bushing assembly. Remove stabilizer bar and bushings from vehicle. Check all rubber bushings for excessive wear, deterioration or damage. Replace as necessary.

Installation

To install, reverse removal procedure. Bushings should be installed with slit area toward front of vehicle. Apply rubber lubricant to bushings to aid in installation. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** .

COIL SPRINGS

Removal

1. Raise and support vehicle with jackstand under frame, with control arms hanging free. Remove wheel and tire assembly. Remove shock absorber. See **SHOCK ABSORBERS** .
2. Install Spring Remover (J-23028-01) on floor jack. Position assembly under lower control arm so bushings seat in grooves of spring remover.

WARNING: Securely bolt Spring Remover (J-23028-01) to floor jack, and install safety chain through lower control arm and coil spring to prevent personal injury.

3. Remove stabilizer bar-to-lower control arm retaining bolt, nut and washers. Disconnect stabilizer bar from lower control arm, and remove rubber grommets and bushing assembly. Raise floor jack to release spring tension on lower control arm pivot bolts. Install safety chain around coil spring and through lower control arm.
4. Remove lower control arm pivot bolts and nuts (rear bolt and nut first). Carefully lower floor jack until all tension is released from coil spring. Remove safety chain and coil spring from vehicle.

CAUTION: DO NOT apply force on lower control arm and ball joint to remove coil spring. Coil spring can easily be removed by maneuvering spring.

Installation

1. Position coil spring onto lower control arm. Ensure spring insulator is in place. Raise control arm with spring remover and floor jack. Ensure coil spring is properly positioned, with end of lower spring coil covering one drain hole in lower control arm, and clear of or partially covering other drain hole.

NOTE: Coil spring must be positioned with tape at lowest position. Bottom of spring is coiled helical, and top is coiled flat with a gripper notch near end of spring coil.

2. Install lower control arm pivot bolts and nuts (front bolt and nut first). Pivot bolts must be installed with nuts toward rear of vehicle. To complete installation, reverse removal procedure. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** . Lower vehicle and check wheel alignment. See **WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES** article in WHEEL ALIGNMENT section.

STEERING KNUCKLE

Removal

1. Raise and support vehicle with jackstand under frame, with control arms hanging free.

NOTE: DO NOT place jackstand under lower control arm. Spring tension is needed to break loose ball joint stud.

2. Remove wheel and tire assembly. Remove brake caliper, and wire aside. DO NOT allow brake caliper to hang by brakeline. Remove speed sensor (if equipped). Remove hub/rotor assembly. Remove splash shield. Remove cotter pin and nut from tie rod end. Use Tie Rod Remover (J-6627-A) to separate tie rod end from steering knuckle.
3. If replacing steering knuckle, carefully remove steering knuckle grease seal. Position

floor jack under lower control arm between ball joint and spring seat. Raise floor jack until lower control arm is just supported.

CAUTION: Support lower control arm with floor jack during removal and installation of steering knuckle.

4. Remove cotter pins and nuts from upper and lower ball joints. Using Ball Joint Separator (J-23742), separate ball joint studs from steering knuckle. See **Fig. 2** . Raise upper control arm to disengage ball joint stud from steering knuckle. Remove steering knuckle.

Inspection

Inspect tapered holes in steering knuckle for out-of-round, deformation or damage. Inspect spindle for worn or damaged threads. Replace steering knuckle as necessary.

CAUTION: When installing upper and lower ball joint stud nuts, DO NOT loosen nut to install cotter pin.

Installation

1. To install, reverse removal procedure. Install NEW grease seal on steering knuckle (if removed). Tighten ball joint stud nuts to align cotter pin holes as necessary. Install tie rod end stud into steering knuckle.
2. Install Steering Linkage Installer (J-29193) or (J-29194). Tighten steering linkage installer to 40 ft. lbs. (54 N.m) to seat tie rod taper. Remove steering linkage installer and install tie rod end stud nut.
3. To complete installation, reverse removal procedure. Adjust wheel bearings. See **FRONT WHEEL BEARINGS** under ADJUSTMENTS. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** . Lower vehicle and check wheel alignment. See **WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES** article in WHEEL ALIGNMENT section.

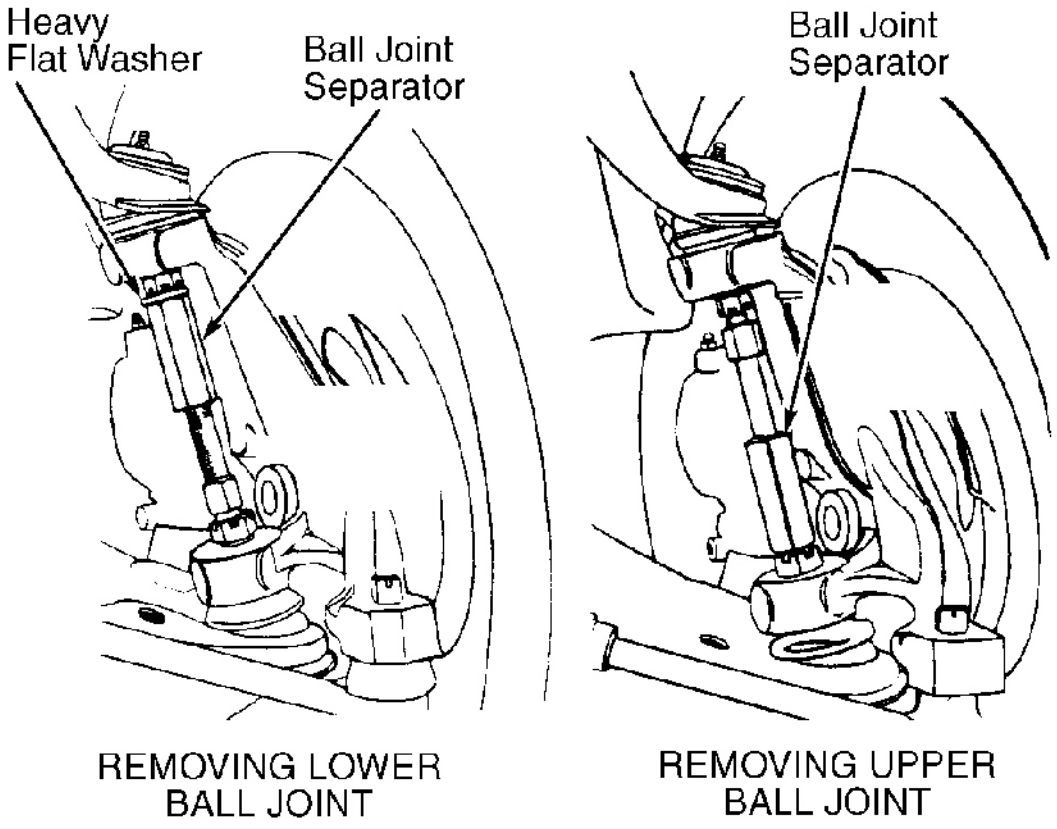

Fig. 2: Separating Upper & Lower Ball Joints From Steering Knuckle
Courtesy of GENERAL MOTORS CORP.

UPPER BALL JOINT

Removal

1. Raise and support vehicle with jackstand under lower control arm, between ball joint and spring seat. Jackstand must remain under lower control arm during upper ball joint servicing to maintain lower control arm and coil spring positioning.
2. Remove wheel and tire assembly. Remove brake caliper, and wire aside. DO NOT allow brake caliper to hang by brakeline. Remove nut securing speed sensor harness (if equipped). Remove grease fitting and cotter pin from upper ball joint stud. Remove upper ball joint stud nut.
3. Install Ball Joint Separator (J-23742) between upper and lower ball studs. See **Fig. 2** . Extend bolt on ball joint separator to loosen ball joint stud from steering knuckle. Remove ball joint separator. Separate ball joint from steering knuckle.
4. Using drill motor and 1/8" (3.18 mm) drill bit, drill 1/4" (6.35 mm) deep hole in ball joint retaining rivets. Using 1/2" (12.7 mm) drill bit, drill out rivet heads. Using a

hammer and small punch, drive out rivets and remove upper ball joint from upper control arm.

CAUTION: When installing upper and lower ball joint stud nuts, DO NOT loosen nut to install cotter pin.

Installation

To install, reverse removal procedure. Use NEW nuts and bolts to install ball joint into upper control arm. Install grease fitting and lubricate NEW ball joint. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** . Lower vehicle and check wheel alignment. See **WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES** article in WHEEL ALIGNMENT section.

LOWER BALL JOINT

Removal

1. Raise and support vehicle with jackstand under lower control arm between ball joint and spring seat. Jackstand must remain under lower control arm during lower ball joint servicing to maintain lower control arm and coil spring positioning.
2. Remove wheel and tire assembly. Remove brake caliper, and wire aside. DO NOT allow brake caliper to hang by brakeline. Remove grease fitting, rubber grease seal and cotter pin from lower ball joint stud. Remove lower ball joint stud nut.
3. Install Ball Joint Separator (J-23742) between upper and lower ball studs. See **Fig. 2** . Extend bolt on ball joint separator to loosen ball joint stud from steering knuckle. Remove ball joint separator. Separate ball joint from steering knuckle.
4. Place a wooden block between upper control arm and frame to keep steering knuckle assembly aside. Obtain "C" Clamp (J-9519-30) and Removers (J-9519-7 or J-9519-40 and J-9519-28) from Ball Joint Remover/Installer Set (J-9519-D), and assemble on lower control arm. See **Fig. 3** . Remove ball joint from lower control arm.

CAUTION: When installing upper and lower ball joint stud nuts, DO NOT loosen nut to install cotter pin.

Installation

1. Obtain "C" Clamp (J-9519-30) and Installer (J-9519-16) from ball joint remover/installer set, and assemble on lower control arm. See **Fig. 3** . Reverse removal procedure to install ball joint into lower control arm. Ensure bleed vent in rubber grease seal is facing inward. Install grease fitting and lubricate NEW ball joint.
2. To complete installation, reverse removal procedure. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** . Lower vehicle and check wheel

alignment. See **WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES** article in WHEEL ALIGNMENT section.

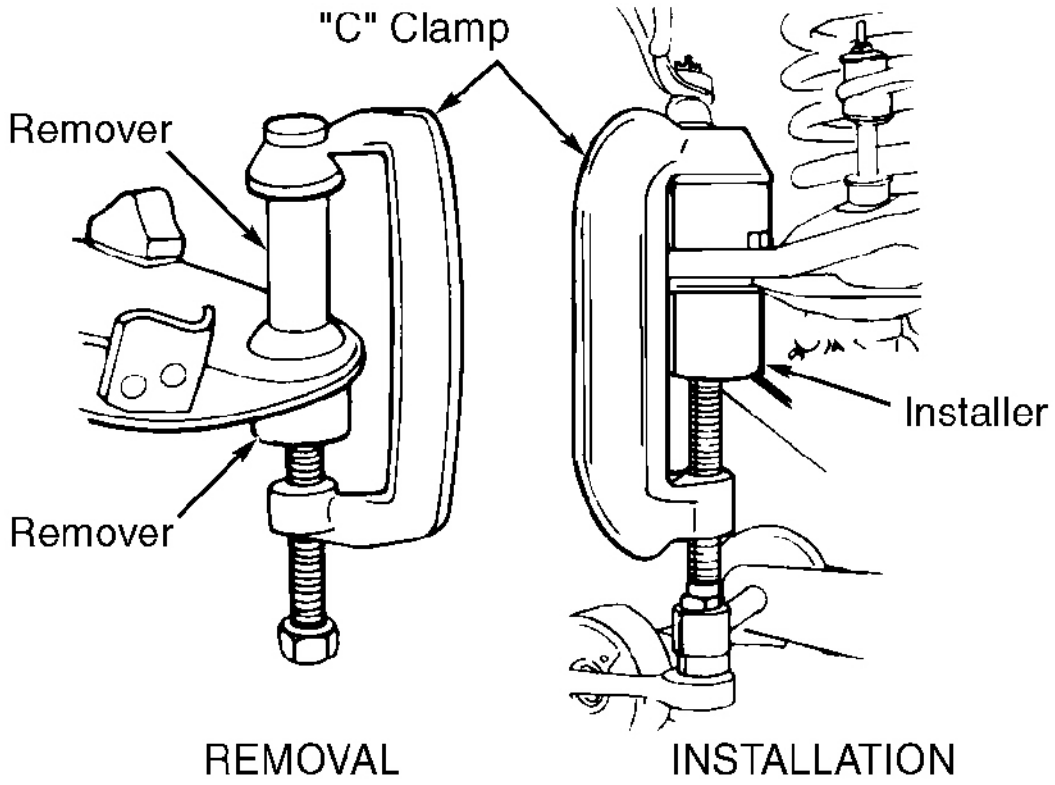

Fig. 3: Removing & Installing Lower Control Arm Ball Joint
Courtesy of GENERAL MOTORS CORP.

UPPER CONTROL ARM

Removal

1. Note location of alignment shims for reassembly. Remove upper control arm pivot shaft-to-frame nut and shim. See **Fig. 1** . Raise and support vehicle with jackstand under lower control arm, between ball joint and spring seat. Ensure jackstand remains under lower control arm during upper control arm servicing to maintain lower control arm and coil spring positioning.
2. Remove wheel and tire assembly. Remove grease fitting and cotter pin from upper ball joint stud. Remove upper ball joint stud nut. Install Ball Joint Separator (J-23742) between upper and lower ball studs. See **Fig. 2** . Extend bolt on ball joint separator to loosen ball joint stud from steering knuckle. Remove ball joint separator. Separate ball joint from steering knuckle. Lift upper control arm, and remove upper control arm pivot

shaft-to-frame bolts. Remove upper control arm.

Installation

1. To install, reverse removal procedure.
2. Ensure holes in upper control arm shaft align with holes in frame. Ensure alignment shims are installed in original position.
3. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** . Lower vehicle. Check wheel alignment. See **WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES** article in WHEEL ALIGNMENT section.

UPPER CONTROL ARM BUSHINGS

Pivot Shaft Bushing Replacement

1. Remove upper control arm from vehicle. See **UPPER CONTROL ARM** . Place upper control arm in soft-jawed vise. Remove nuts and retainers from ends of pivot shaft.
2. Using Bushing Remover/Installer (J-22269-1) and Receiver/Installer (J-21474-5), press bushing and pivot shaft from upper control arm. Repeat procedure for opposite bushing.
3. To install, place pivot shaft in upper control arm. Using Bushing Remover/Installer (J-22269-1) and small piece of pipe with the same outer diameter as bushing, press NEW bushing into upper control arm and onto pivot shaft.
4. Ensure each bushing is positioned .48-.52" (12.2-13.2 mm) from face of control arm to bushing outer sleeve. Repeat procedure for bushing on opposite end. Install nuts and retainers onto upper control arm pivot shaft ends.

LOWER CONTROL ARM

Removal

1. Raise and support vehicle with jackstand under frame, with control arms hanging free. Remove wheel and tire assembly. Remove coil spring. See **COIL SPRINGS** . Separate lower ball joint from steering knuckle. See **LOWER BALL JOINT** .
2. Separate lower control arm from steering knuckle and carefully maneuver out of opening in splash shield. Remove lower control arm-to-frame pivot bolts and nuts (rear bolt and nut first). Remove lower control from vehicle.

Installation

1. To install, reverse removal procedure. Use NEW nuts on lower control arm pivot bolts. Install lower control arm pivot bolts and nuts (front bolt and nut first). Ensure lower control arm pivot bolts are installed with bolt heads facing toward front of vehicle, and are tightened to specification with vehicle at riding height.
2. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** . Lower

vehicle and check wheel alignment. See **WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES** article in WHEEL ALIGNMENT section.

LOWER CONTROL ARM BUSHINGS

Front Bushing Replacement

1. Remove lower control arm from vehicle. See **LOWER CONTROL ARM** . Place lower control arm in soft-jawed vise. Using a blunt chisel, drive front bushing flare down even with rubber of bushing. Install appropriate lower control arm bushing service equipment. See **CONTROL ARM BUSHING SERVICE EQUIPMENT** table.
2. Tighten nut until front bushing is removed from lower control arm. To install front bushing, assemble appropriate control arm bushing service equipment. See **Fig. 4** .
3. Position NEW front bushing into lower control arm with lip side of bushing on outside of lower control arm. Tighten nut until bushing is fully seated into lower control arm. Flare front bushings after installation. See **Fig. 5** . Turn nut on flaring die until bushing is flared about 45 degrees. Remove bushing flaring die and other service equipment.

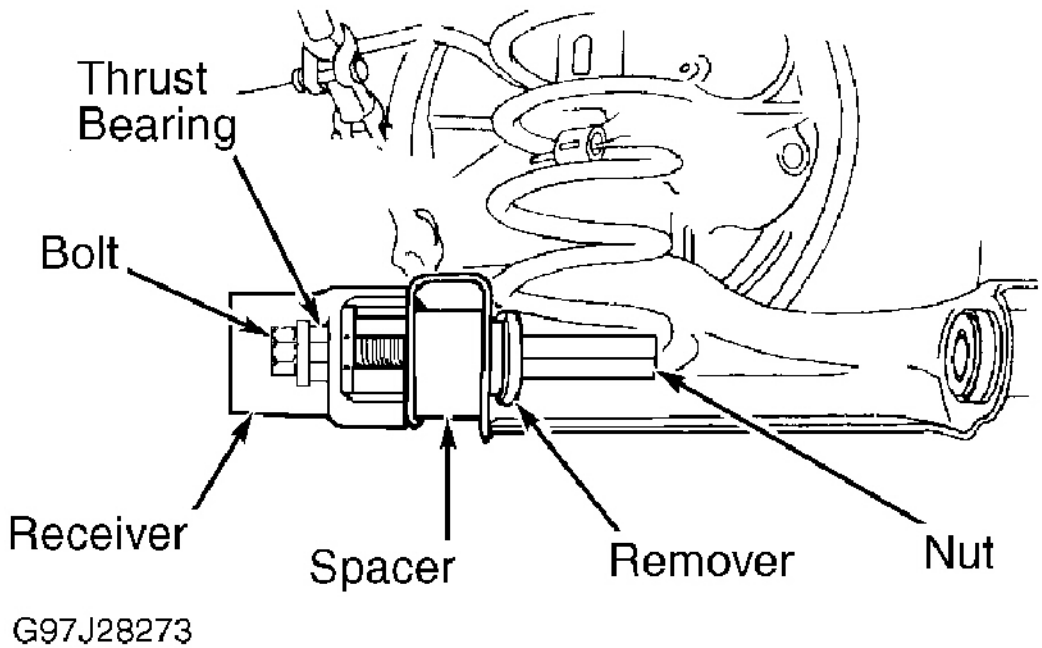

Fig. 4: Removing Lower Control Arm Front Bushing (Typical)
Courtesy of GENERAL MOTORS CORP.

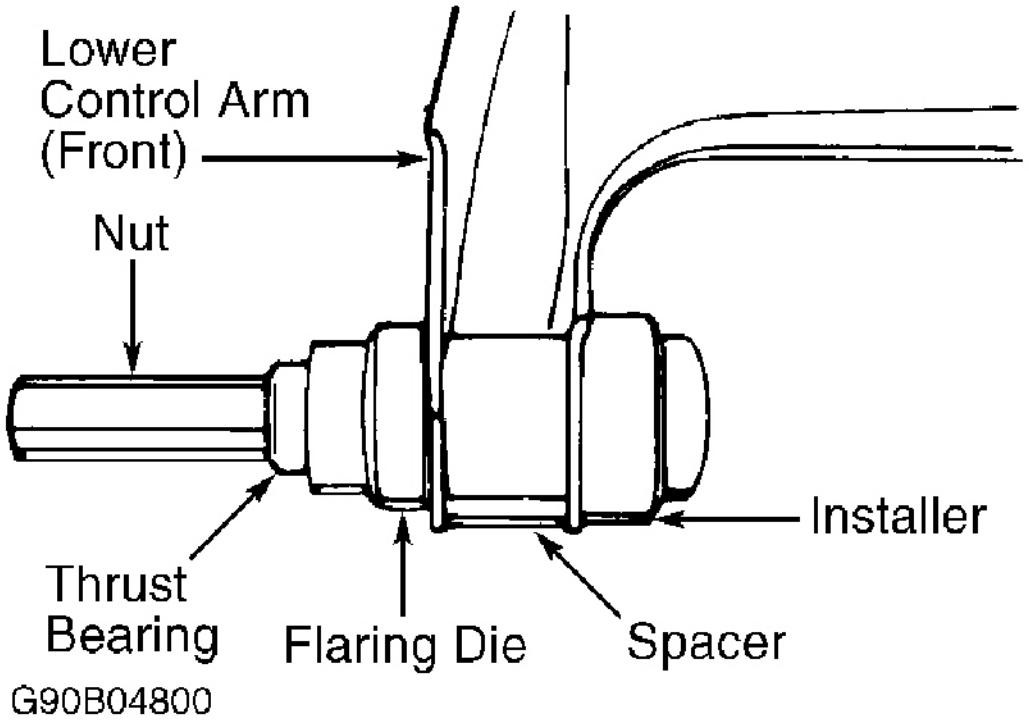

Fig. 5: Flaring Lower Control Arm Front Bushing
Courtesy of GENERAL MOTORS CORP.

CONTROL ARM BUSHING SERVICE EQUIPMENT

Application	Tool Number
Bolt	J-21474-19
Bushing Installer	J-21474-13
Bushing Remover	J-21474-8
Flaring Die	J-21474-2
Nut	J-21474-18
Receiver/Installer	J-21474-5
Spacers	J-22222-5 & J-21474-12

Rear Bushing Replacement

1. Remove lower control arm from vehicle. See **LOWER CONTROL ARM** . Place lower control arm in soft-jawed vise.
2. Install appropriate receiver, remover, spacer, nut and bolt as indicated. See **Fig. 6** . See **CONTROL ARM BUSHING SERVICE EQUIPMENT** table. Tighten nut until rear bushing is removed from lower control arm.

3. Assemble control arm bushing service set. Install nut, bolt, spacer and receiver. Position NEW rear bushing into lower control arm with lip side of bushing on outside of lower control arm. Tighten nut until bushing is fully seated into lower control arm.

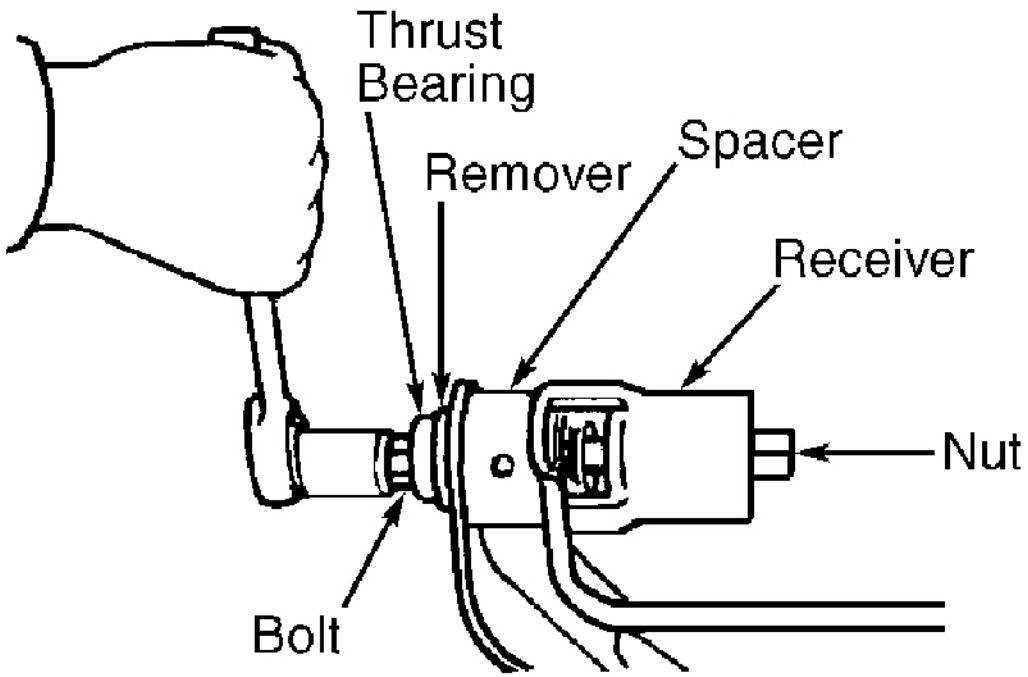

Fig. 6: Removing Lower Control Arm Rear Bushing
Courtesy of GENERAL MOTORS CORP.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	**Ft. Lbs. (N.m)**
Ball Joint-To-Steering Knuckle Nut	
Lower	79 (107)
Upper	61 (83)
Lower Control Arm-To-Frame Pivot Bolt Nuts	
Front Bolt	(1) 85 (115)
Rear Bolt	(1) 72 (98)
Shock Absorber-To-Frame Nut	(2)

Application	Ft. Lbs. (N.m)
Shock Absorber-To-Lower Control Arm Bolts	13 (18)
Splash Shield-To-Steering Knuckle Nut	19 (26)
Stabilizer Bar To-Frame Bolts	37 (50)
Stabilizer Bar To-Lower Control Arm Nut	(3) 13 (18)
Tie Rod End-To-Steering Knuckle Nut	39 (53)
Upper Ball Joint-To-Control Arm Nuts	17 (23)
Upper Control Arm Pivot Shaft Nuts	85 (115)
Upper Control Arm Pivot Shaft-To-Frame Nuts	66 (89)
Wheel Lug Nut	95 (130)

(1) Tighten with suspension loaded (weight of vehicle on wheels).

(2) 97 INCH lbs. (11 N.m)

(3) Obtain torque by running nut to unthreaded portion of bolt.

1996 Chevrolet Blazer

SUSPENSION - FRONT COIL SPRING (2WD) 1996 SUSPENSION General Motors Corp. - Front 2WD Coil Spring